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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/633,760

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Daphna Weinshall

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01/06/2005

PHILIPS INTELLECTUAL PROPERTY & STANDARDS

P.O. BOX 3001

BRIARCLIFF MANOR, NY 10510

EXAMINER

KIBLER, VIRGINIA M

ART UNIT

PAPER NUMBER

2623

DATE MAILED: 01/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/633,760

Applicant(s)

WEINSHALL ET AL.

Examiner

Virginia M Kibler

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 September 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 and 17-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 and 17-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. The amendment received on 9/4/04 has been entered. Claims 1-12 and 17-26 remain pending.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-4, 6, 11, and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Weinshall et al. (*From Ordinal to Euclidean Reconstruction with Partial Scene Calibration*).

Regarding claim 1, Weinshall et al. ("Weinshall") discloses a method of determining a position of an unknown point in space using at least two cameras (Page 216, para. 2-6) aimed to have a substantially overlapping field of view (Page 209, para. 5) including generating in each of the cameras an image corresponding to at least four points lying in a reference plane (Page 209, para. 2; Sect. 2.2), the reference plane being common to the respective images of the cameras (Sect. 2.1), calculating a planar projective transform that maps the images of the at least four points to a reference frame, the reference frame being a projection of the reference plane (Page 211, para. 4-6), generating in each of the cameras, images of at least two calibration markers whose positions relative to the reference plane are known and an image of an unknown point

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(Page 215, para. 3-5 and Page 216, para. 1), for each of the images of the calibration markers and the image of the unknown point, applying the transform to define respective points in a plane of the image (Page 217, para. 2), and computing at least a distance of the unknown point from the reference plane responsively to the points defined in the reference frame for the markers and the unknown point (Page 216, para. 1-2).

Regarding claim 2, Weinshall discloses computing at least the distance of the unknown point including computing a distance of the unknown point from the reference plane responsively to positions of the calibration markers (Page 216, para 2).

Regarding claim 3, Weinshall discloses the positions indicate a distance of the calibration markers from the reference plane (Page 216, para. 2).

Regarding claim 4, Weinshall discloses positioning the calibration markers in the overlapping field of view (Page 216, para. 1).

Regarding claim 6, Weinshall discloses the position of each calibration markers includes only a distance from the reference plane (Page 216, para. 2).

Regarding claim 11, the arguments analogous to those presented above for claim 1 are applicable to claim 11. Weinshall further discloses computing optical centers of the cameras responsively to a result of the step of transforming (Page 212).

Regarding claim 12, Weinshall discloses transforming the images of the unknown point using the planar projective transform (Page 209, para. 2).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 5, 7, 8, 10, and 17-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weinshall et al. (*From Ordinal to Euclidean Reconstruction with Partial Scene Calibration*) as applied to claim 1 above, and further in view of Wilson et al. (5,386,299).

Regarding claim 5, Weinshall does not appear to include extending a boom with markers. However, Wilson et al. ("Wilson") teaches that it is known to extend a boom with markers (Col. 3, lines 29-38). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the calibration markers disclosed by Weinshall to include using a boom with the markers as taught by Wilson as an alternative way to position the calibration markers.

Regarding claim 7, Weinshall discloses a 3D reconstruction system including at least two cameras using at least two calibration markers and at least four reference markers. Weinshall does not recognize using a jig having a structure to support the calibration and reference markers. However, Wilson teaches that it is known to include structure to support two cameras as well as a movable member to position markers (Col. 3, lines 29-38). While Wilson does not specify including two calibration markers as well as four reference markers it would have been obvious in light of his disclosure. Therefore, it would have been obvious to one of ordinary skill in the

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art at the time of the invention to have modified the calibration and reference markers disclosed by Weinshall to include a structure to support the cameras and markers, as taught by Wilson, as an alternative way to position the markers.

Regarding claim 8, Weinshall discloses the requirement that the 3D coordinates of four reference markers are given (Page 209, para. 2). While Weinshall does not specify the four reference markers, it would have been obvious in light of his disclosure to expressly state the corners of an aperture as the four reference markers as a design choice.

Regarding claims 17 and 24, the arguments analogous to those presented above for claims 1, 7, and 8 are applicable to claims 17 and 24. Weinshall further discloses a processor configured to determine a relative location of an object based on an image of the object in at least two fields of view and based on a substantially orthogonal image (Sect. 2).

Regarding claims 18 and 25, the arguments analogous to those presented above for claim 17 are applicable to claims 18 and 25. Weinshall discloses providing calibration markers positioned at two known distances (Page 215, para. 3-5, Page 216, para. 1) and determining a distance of the object from the reference plane based on one or more images of the calibration markers at the two known distances (Page 216).

Regarding claim 19, the arguments analogous to those presented above for claim 5 are applicable to claim 19.

Regarding claim 20, Weinshall discloses determining the relative location of the object independent of any physical dimensions of the system (Page 216).

Regarding claims 21 and 23, Weinshall discloses at least one camera (Sect. 2).

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Regarding claims 22 and 26, Weinshall discloses determining the relative location of the object independent of optical settings of the camera (Page 216).

Regarding claim 10, the arguments analogous to those presented above for claim 1 are applicable to claim 10.

6. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Weinshall et al. (*From Ordinal to Euclidean Reconstruction with Partial Scene Calibration*) in view of Wilson et al. (5,386,299) as applied to claim 7 above, and further in view of Proesmans et al. (6,510,244).

Regarding claim 9, Weinshall and Wilson do not appear to recognize the reference markers being projected onto a screen of the jig. However, Proesmans et al. ("Proesmans") teaches that it is known to project a predetermined pattern, thereby reference markers, onto a scene (Abstract, lines 1-3). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the reference makers disclosed by Weinshall and Proesmans to include projecting them onto a screen, as taught by Proesmans, as an alternative way to position the markers.

Response to Arguments

7. Applicant's arguments filed 9/4/04 have been fully considered but they are not persuasive.

Summary of Applicant's Argument: Weinshall does not teach using four reference marks in each of the visual fields of the cameras that lie in a common plane. Weinshall teaches using the homography that relates each image to a reference plane, and maps a set of reference points

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in the images to the reference plane. Weinshall does not teach that each of these reference points must lie in a common plane.

Examiner's Response: Weinshall discloses the four reference marks lying in a common plane, or reference plane, as shown pages 211-213. For example, Weinshall discloses columns $[a_i \ b_i \ 0 \ 1]$ of matrix P are coordinates of points on the reference plane (Page 211). Weinshall discloses using four reference marks in each of the visual fields of the cameras (t and s) that lie in a common plane (Page 213). Therefore, Weinshall's disclosure meets the claimed language recited in claims 1 and 11.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

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Contact Information

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Virginia M Kibler whose telephone number is (703) 306-4072. The examiner can normally be reached on Mon-Thurs 8:00 - 5:30 and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (703) 308-6604. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Virginia Kibler
1/05/05

**MEHRDAD DASTOURI
PRIMARY EXAMINER**

